

A REVISION OF *PROCAMBRIDGEA* FORSTER & WILTON, (ARANEAE:
AMAUBROBIOIDEA: STIPHIDIIDAE)

VALERIE TODD DAVIES AND CHRISTINE LAMBKIN

Davies, V.E. & Lambkin, C. 2001 06 30: A revision of *Procambridgea* Forster & Wilton, (Araneae: Amaurobioidea: Stiphidiidae). *Memoirs of the Queensland Museum* **46**(2): 443-459. Brisbane. ISSN 0079-8835.

Procambridgea rainbowi Forster and *P. cavernicola* Forster & Wilton have been redescribed and 10 new species described. These are *P. grayi*, *kioloa*, *otwayensis*, *ourimbah*, *hunti*, *carrai*, *monteithi*, *lamington*, *hilleri* and *montana*. The species have been collected from sites in SE Queensland, northern and eastern New South Wales and from the Otway Range in Victoria. Cladistic analysis shows that they form a monophyletic group and infers that *Procambridgea* is more closely related to the Stiphidiidae than any other group. □
Procambridgea, new species, Stiphidiidae, Amaurobioidea, cladistics.

Valerie E. Davies, Honorary Associate, Queensland Museum, PO Box 3300, South Brisbane 4101; Christine L. Lambkin, Department of Zoology & Entomology, University of Queensland, St Lucia 4072, Australia; Present address: CSIRO, Entomology, PO Box 1700, Canberra 2601, Australia; 28 March 2001.

Procambridgea, an Australian genus of cribellate spiders was described by Forster & Wilton (1973: 134) and placed in the Stiphidiidae along with several ecribellate spiders from New Zealand. Comprehensive descriptions of the type species, *P. rainbowi* and *P. cavernicola* were given. Examination of further Australian species has shown the importance of several characters which we illustrate for these two species.

Procambridgea is a small spider, seldom exceeding 5.0 in length; it has the nondescript pattern of most amaurobioids (Lehtinen, 1967: figs 42-67). Webs are often in the hollows of fallen logs in the form of a small suspended sheet, on the underside of which the spider sits. In the same way that *Stiphidion facetum* has been introduced to New Zealand from Australia, recently *Procambridgea* has been found in Auckland, New Zealand.

MATERIAL AND METHODS

Spiders from rainforest areas in SE Queensland, from cave and forest areas in New South Wales (NSW) and 4 mature specimens from the Otway Ranges in Victoria were examined. Most were collected in pitfall (PF) traps. Notation of spines follows Platnick & Shadab (1975). Illustrations were drawn with the aid of a camera lucida; the left male palp is illustrated. The epigyna appear to be very conservative and vary little between species thus there is an emphasis on ♂ characters and ♂♂ only are used in the Key. Cladistic methods are given under heading 'Relationships of *Procambridgea*'.

ABBREVIATIONS. Museums: AM, Australian Museum, Sydney; MNZ, Museum of New Zealand, Te Papa Tongarewa, Wellington; QM, Queensland Museum, Brisbane; WAM, Western Australian Museum, Perth.

Collectors: CH, C. Horseman; GBM, G.B. Monteith; MRG, M.R. Gray; RJR, R.J. Raven; SRM, S.R. Monteith; VED, V.E. Davies.

Location data: SF, State Forest; NP National Park.

Anatomical: AL, abdomen length; ALE, anterior lateral eyes; ALS, anterior lateral spinnerets; AME, anterior median eyes; APOPH, apophysis; AW, abdomen width; C, conductor; CB, cymbium; CAL, calamistrum; CI, cheliceral; CL, carapace length; CR, cribellum; CW, carapace width; E, embolic; EG, epigastral groove; EPIG, epigynal; ID, insemination duct; MAP, major ampullate spigots; mAP, minor ampullate spigot; MT, metatarsal; P, patellar; PCB, paracymbial; PCR, paracribellar spigots; PE, pambolic; PLE, posterior lateral eyes; PLS, posterior lateral spinnerets; PME, posterior median eyes; PMS, posterior median spinnerets; RTA, retrolateral tibial apophysis; T, tarsal; TRICH, trichobothria.

Abbreviations on illustrations are explained in the legends.

SYSTEMATICS

Procambridgea Forster & Wilton

Procambridgea gen. nov. Forster & Wilton, 1973: 134

TYPE SPECIES. *Procambridgea rainbowi* Forster & Wilton.

DIAGNOSIS. Three-clawed cribellate. Red-brown cephalothorax and legs, darker abdomen with lighter chevron pattern which is often faded or absent. AME smallest; from above posterior row of eyes straight to slightly procurved, anterior row recurved (Fig. 1A); from the front posterior row strongly procurved (Fig. 5I). Cheliceral promargin with 2 large teeth and 4-5 minute teeth; retrmarginal with 7 small contiguous teeth decreasing in size towards the base of the fang (Fig. 1B). Prolateral filamentous seta at base of fang longer than other setae. Labium slightly longer than wide; sternum slightly longer than wide, pointed posteriorly. Legs 1423, without feathery hairs; incomplete pre-distal fracture on tarsi (Raven, in prep.). Trochanters notched. Tarsal triehobothria in single row increasing in length distally, bothrium collariform; tarsal organ slit-like, broadening distally. Cribellum with two spinning fields in female, large broad colulus in male. Small epigynum with median longitudinal ridge, anterior gonopores. Male palp with oval tegulum; course of sperm duct showing clearly. Conductor, a membranous plate often partly sclerotised with distal folds around the spiniform embolus (Fig. 1F). Median apophysis reduced or absent. Cymbium with or without long post-alveolar extension; with or without bulge (paracymbium) on proximal retrolateral edge; if present bulge with or without processes. ALS largest with short conical terminal segment; two major ampullate spigots in female. PLS slender with longer terminal segment.

KEY TO ♂ ♂ PROCAMBRIDGEA spp.

1. Palpal tibia with proximal spur (Fig. 5E). *monteithi*
Palpal tibia without proximal spur 2
2. Paracymbium without processes 3
Paracymbium with processes (Fig. 5O) 9
3. Median apophysis absent 4
Median apophysis present (Fig. 1M) 5
4. RTA with small dorso-retrolateral branch (Fig. 4K)
. *carrai*
RTA without small dorso-retrolateral branch. *rainbowi*
5. Cymbial alveolus as short or shorter than post-alveolus.
Posterior RTA absent 6
Cymbial alveolus longer than post-alveolus. Posterior RTA present (Fig. 3E). *otwayensis*
6. Conductor large and membranous 7
Conductor small, often partly sclerotised. 8
7. RTA with dorso-retrolateral branch. *cavernicola*
RTA without dorso-retrolateral branch. *hundi*
8. Alveolus: post-alveolus about equal. Sperm duct with open loop (Fig. 2K) *kioloa*
Alveolus: post-alveolus 1:3. Sperm duct with closed loop *grayi*
9. Paracymbium with retrolateral process only. Loop of sperm duct simple *ourimbah*
Paracymbium with retrolateral and ventral processes. Loop of sperm duct complex (Fig. 5O) 10
10. Embolic region about half length of tegulum. Sperm duct with transverse loop 11
Embolic region about quarter length of tegulum. Sperm duct with longitudinal loop *montana*
11. Ventral paracymbial process pointed. Loop of sperm duct closed *lamington*
Ventral paracymbial process small and blunt. Loop of sperm duct open *hilleri*

***Procambridgea rainbowi* Forster & Wilton (Figs 1A-I, 8A)**

P. rainbowi Forster & Wilton, 1973:134, figs 403-406; Brignoli, 1981: 533 (catalogue).

MATERIALS. HOLOTYPE: ♀, rainforest, Jenolan, Blue Mountains, NSW, Australia, 33°30'S, 150°23'E, 18 July 1970, R.R. Forster (AMKS30617). ALLOTYPE: ♂, same data as holotype. (AMKS30616). OTHER MATERIAL: NSW, ♂, Mt Wilson, Cathedral of Ferns area, 33°30'S, 150°23'E, PF, 14 Aug. 1978, CH (AMKS1677); ♀, same locality, PF, 15 Feb. 1978, CH (AMKS1506); ♀, Mt Wilson, under log, 28 Oct. 1981, CH, D. Kent (AMKS8412); ♀, Mt Wilson, Cathedral of Ferns, under log in rainforest, 17 Apr. 1974, MRG (AMKS32777); 3♀, same locality, in sheet webs in logs, 26 June 1974, MRG (AMKS32778); ♀, 18km E Woodford, Blue Mtns NP, 33°44'S, 150°33'E, under log, 17 Apr. 1974, MRG (AMKS32776).

DIAGNOSIS. Cymbium with slight sclerotisation of posterior retrolateral edge; long cymbial extension; post alveolus is x 1.5 length of alveolus. Without median apophysis; large membranous conductor. ♂ palp with long femoral and tibial segments.

DESCRIPTION. See Forster & Wilton (1973:134-135) for description of ♀ holotype and ♂ allotype.

Female. CL 2.1 AL 2.0. Legs: I 8.5; II 7.1; III 6.3; IV 8.1. Epigynum (Fig. 1C-E) with anterior gonopores, simple median insemination ducts to spermathecae (Note: the anterior swellings on insemination ducts (Forster & Wilton fig. 406) were not observed). Females 3.3-5.3 long.

Male. CL 2.5 AL 2.3. Legs: I 12.8; II 10.2; III 9.0; IV 11.3. ♂ palp (Fig. 1F-I): embolus short, spiniform arising from distal tegulum; large conductor; no median apophysis, sperm duct with simple loop before entering embolus. Ratio of cymbial alveolus: post-alveolus is 1:1.5. RTA

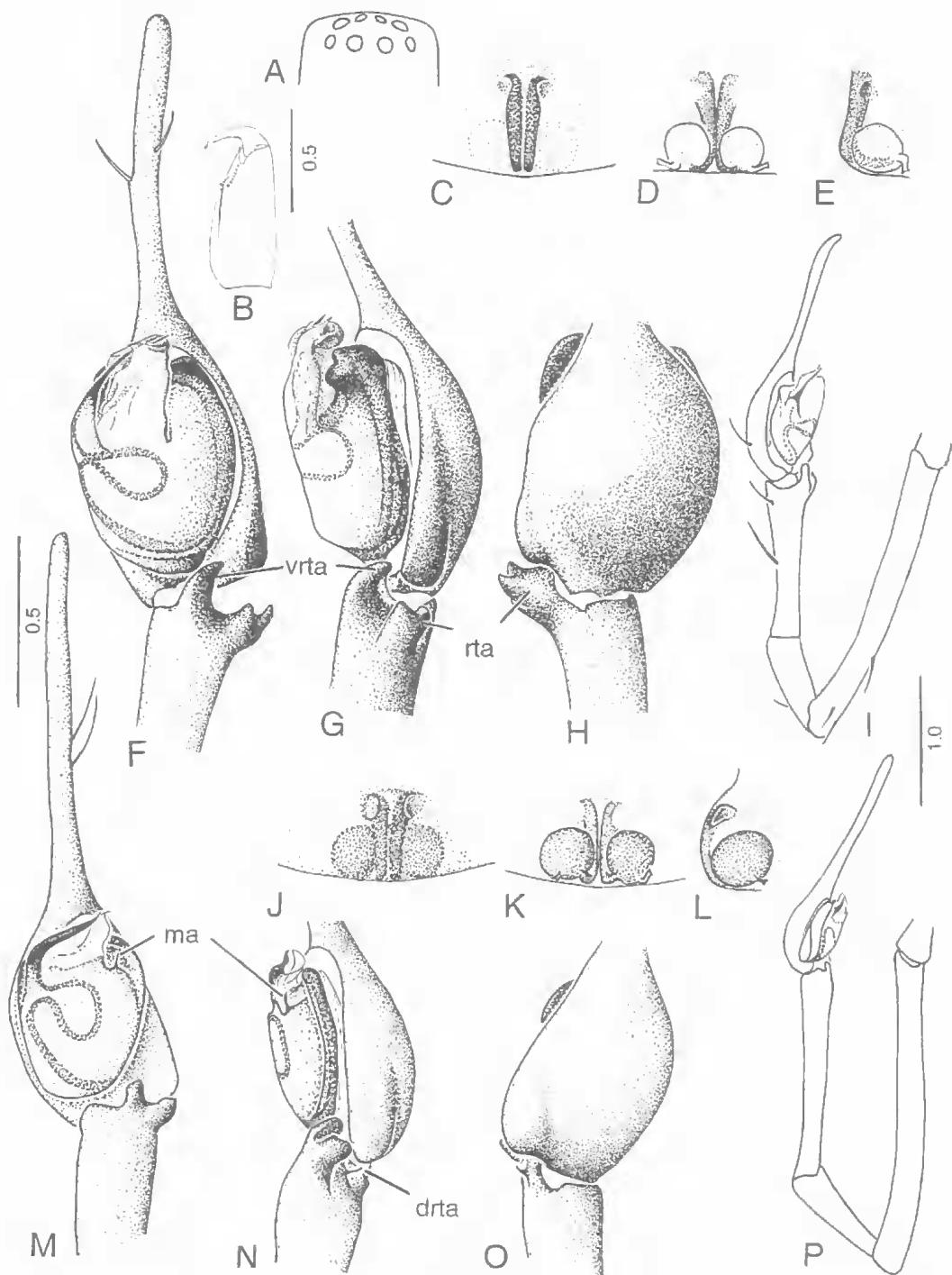


FIG. 1. A-I, *Procambridgea rainbowi* Forster & Wilton. A, eyes, dorsal; B, chelicera; C-E, epigynum (ventral, dorsal, lateral); F-I, ♂ palp (ventral, retrolateral, dorsal, entire palp). J-P, *Procambridgea cavernicola* Forster & Wilton: J-L, epigynum (ventral, dorsal, lateral); M-P, ♂ palp (ventral, retrolateral, dorsal, entire palp). drta = dorso-retrolateral branch of tibial apophysis; ma = median apophysis; rta = retrolateral apophysis; vrt'a = ventro-retrolateral branch of tibial apophysis.

with curved ventro-retrolateral and bifid retrolateral branches. Males 4.5-4.8 long.

DISTRIBUTION. Jenolan area, Blue Mountains, NSW (Fig. 8A).

Procambridgea cavernicola Forster & Wilton
(Figs IJ-P, 8A)

P. cavernicola Forster & Wilton, 1973: 136, figs 407-410;
Brignoli, 1981: 533 (catalogue).

MATERIAL. HOLOTYPE: ♂, Wee Jasper Signatore Cave, NSW, 35°09'S, 148°40'E, 2 June 1962, E. Hamilton-Smith (AMKS30614). ALLOTYPE: ♀, same data as holotype (AMKS30615). OTHER MATERIAL: NSW: 2♂, 3♀, Wee Jasper Punchbowl Cave Bat Chamber, 35°09'S, 148°40'E, 10 Sept. 1977, M. Marx (AMKS32758).

DIAGNOSIS. Cave species, less pigmented than *P. rainbowi*. Long cymbial post-alveolus twice length of alveolus; small slender median apophysis; RTA with extra needle-like dorso-retrolateral branch (cf., *P. rainbowi* in all these characters).

DESCRIPTION. See Forster & Wilton (1973: 136) for description of ♂ holotype and ♀ allotype.

Male. CL 2.3 AL 2.5. Legs: I 13.6; II 11.3; III 9.9; IV 12.5. ♂ palp (Fig. 1M-P) with small median apophysis. Cymbium with paracymbial bulge; ratio of alveolus: post-alveolus is 1:2.2. RTA with curved ventro-retrolateral, blunt retrolateral and a needle-like dorso-retrolateral branch. Sperm duct with simple open loop (i.e. arms of loop not touching). Males 4.5-4.8 long.

Female. CL 2.2 AL 3.1. Legs: I 10.5; II 9.3; III 8.2; IV 10.3. Epigynum (Fig. IJ-L) similar to *P. rainbowi* with slightly larger gonopores. [Note: The posterior process (Forster & Wilton fig. 409) is thought to be due to damage; it is not present on other females]. Females 5.3-5.5 long.

DISTRIBUTION. Wee Jasper, NSW (Fig. 8A).

Procambridgea grayi Davies sp. nov.
(Figs 2A-G, 8A)

ETYMOLOGY. In honour of Michael Gray, arachnologist at the Australian Museum and collector of much of the material for this revision.

MATERIAL. HOLOTYPE: ♂, Lane Cove River Park nr Fullers Bridge, NSW, 33°47'S, 151°08'E, under rock Hawkesbury sandstone, 6 Apr. 1974, MRG (AMKS32770). PARATYPES: NSW. ♀, same data as holotype (AMKS58083); ♀, Gordon, 33°44'S, 151°09'E, PF, 24 Apr. 1984, CH (AMKS14400); ♀, Mooney Mooney Ck, 33°31'S, 151°12'E, in rainforest, 13 Jan.

1977, MRG (AMKS32771); ♂, ♀, Bobbin Head, Kuringai Chase NP, 33°39'S, 151°09'E in log, 10 Apr. 1974, MRG (AMKS32772); ♂, ♀, same data (AMKS32774); 2♀, same locality, sheet web under logs, 2 Nov. 1974, MRG (AMKS32773); ♂, ♀, St Ives, 33°44'S, 151°10'E, under log in wet sclerophyll forest, 7 Aug. 1971, MRG, GE. Gray (AMKS32775). OTHER MATERIAL: New Zealand. ♀, ♂, juvs, Air Raid Tunnel, Alten Reserve, Auckland. NZMS 260 R11 685 820, 15 Oct. 1999, M. Hunt (MNZ).

DIAGNOSIS. ♂ palp with small membranous conductor with sclerotised tip (cf., *P. rainbowi*, *P. cavernicola*). Paracymbial bulge with small posterior projection. Needle-like median apophysis (cf., *P. rainbowi*).

DESCRIPTION. *Male*. CL 1.9 AL 2.1. ♂ palp (Fig. 2D-J) with short embolus; small membranous conductor; needle-like median apophysis. Simple sperm duct with arms of loop touching. Ratio of cymbial alveolus: post-alveolus is 1:1.3. Posterior edge of cymbium with small rounded projection. RTA with curved ventro-retrolateral and bifid retrolateral branches. Males 3.9-4.1 long.

Female. CL 2.2 AL 2.3. Epigynum (Fig. 2A-C) Females 3.3-4.6 long.

DISTRIBUTION. Sydney area, NSW (Fig. 8A) and introduced to Auckland, New Zealand.

Procambridgea kioloa Davies sp. nov.
(Figs 2H-N, 8A)

ETYMOLOGY. From Kioloa SF, N.S.W.

MATERIAL. HOLOTYPE: ♂, Kioloa SF, Forest Drive, 16km N of Batemans Bay, NSW, 35°37'S, 150°16'E, PF, 28 June 1979, CH (AMKS3834). PARATYPES: NSW. 2♀, same locality and collector as holotype, 28 Aug. 1978, (AMKS1728); ♀, same locality and collector, 30 Apr. 1978 (AMKS1416); ♀, Boyne SF, Old Highway Rd, 35°38'S, 150°11'E, under rock, moist forest, 15 Aug. 1978, MRG (AMKS2074).

DIAGNOSIS. Posterior edge of cymbium with small projection (cf., *P. rainbowi*, *P. cavernicola*). Ratio of alveolus:post alveolus is 1:1 (cf., previous spp.). Sperm ducts with longitudinal loop with arms not touching (cf., *P. grayi*).

DESCRIPTION. *Male*. CL 1.8 AL 1.9. ♂ palp (Fig. 2K-N): very short distal embolus, small conductor, slender median apophysis. Arms of loop (longitudinal) in sperm ducts not touching. Cymbium with sclerotised posterolateral edge with small projection. Alveolus and post-alveolus about equal in length. RTA with

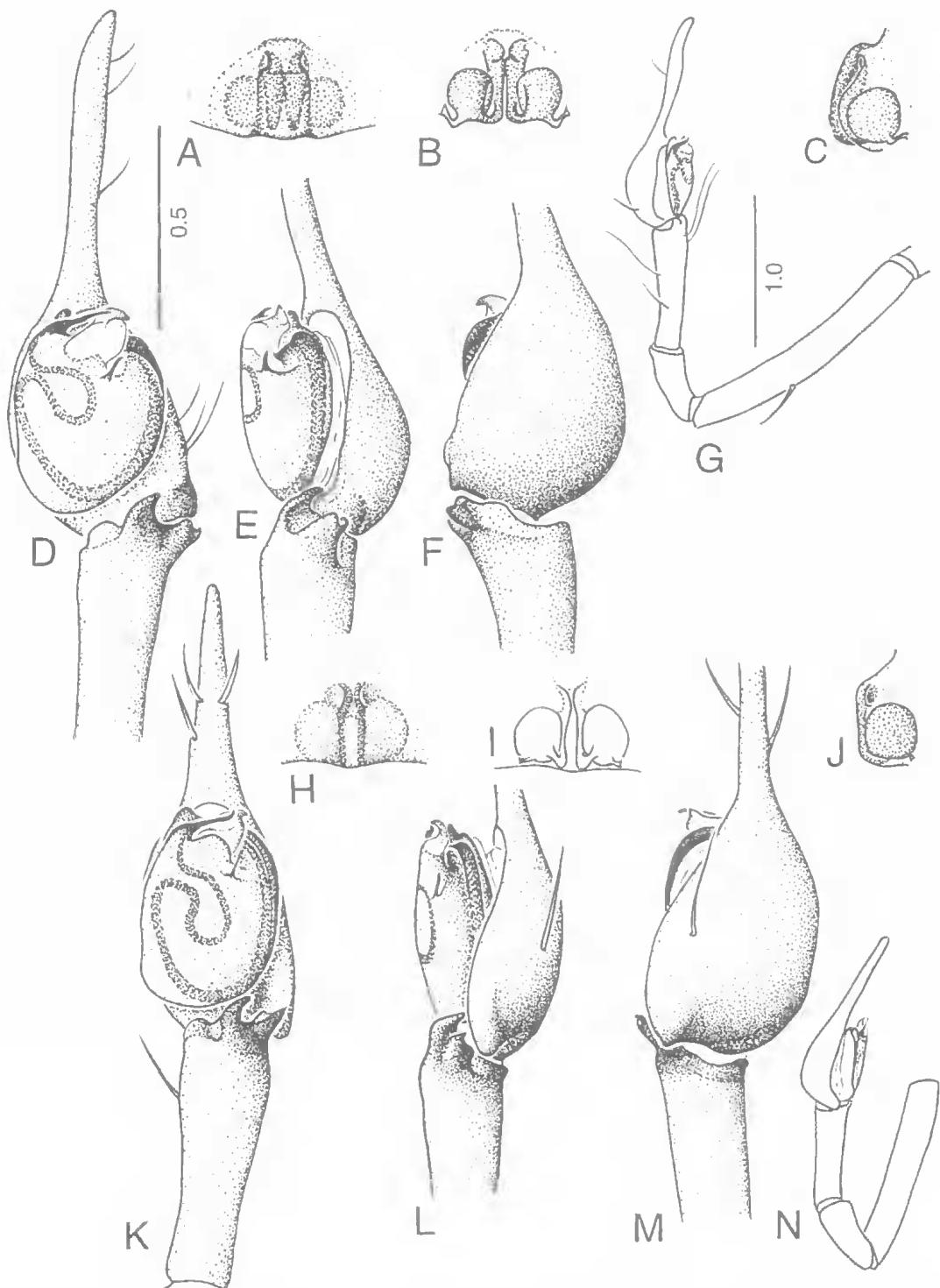


FIG. 2. A-G, *Procambidgea grayi* sp. nov. A-C, epigynum (ventral, dorsal, lateral); D-G, ♂ palp (ventral, retrolateral, dorsal, entire palp). H-N, *Procambidgea kioloa* sp. nov.; H-J, epigynum (ventral, dorsal, lateral); K-N, ♂ palp (ventral, retrolateral, dorsal, entire palp).

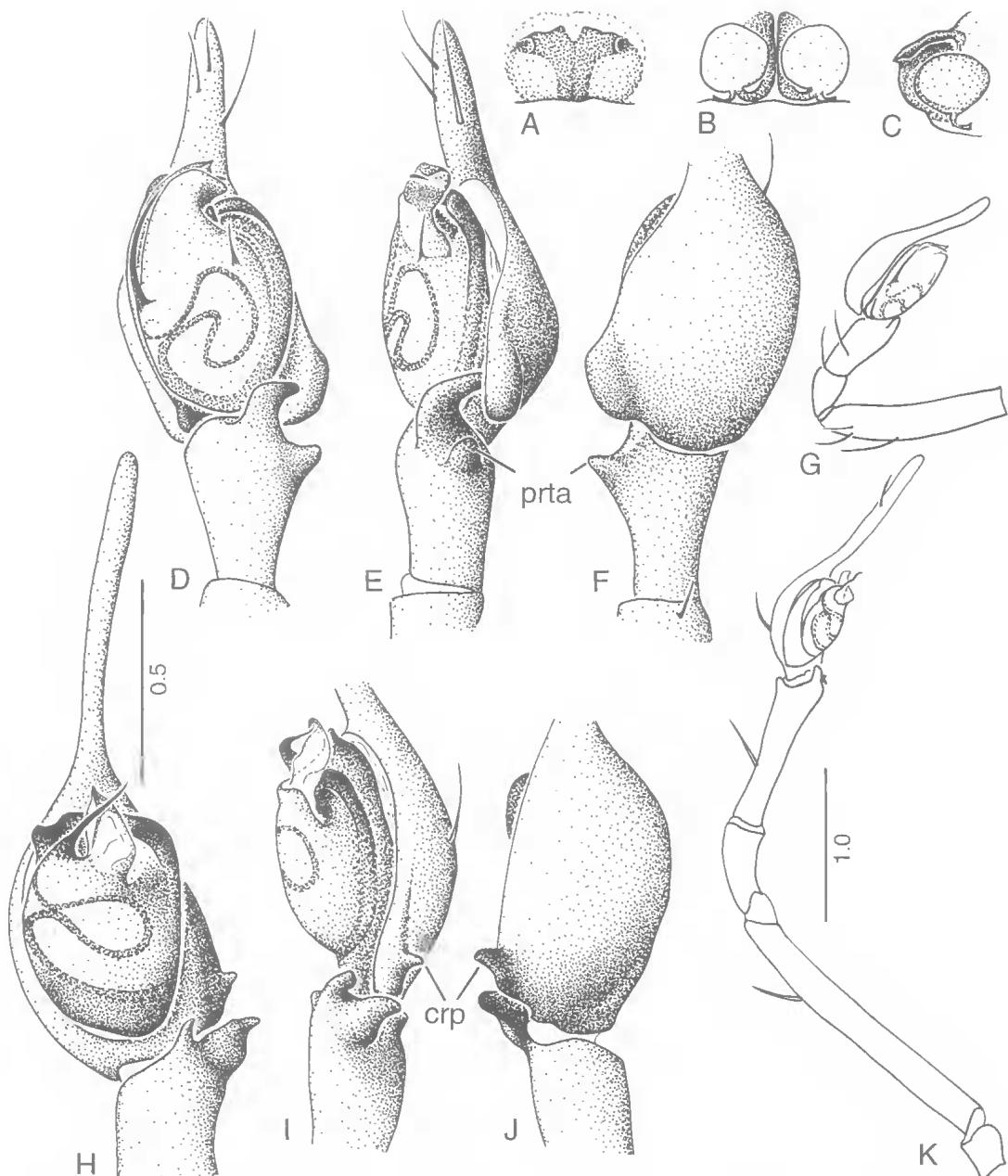


FIG. 3. A-G, *Procambridgea otwayensis* sp. nov. A-C, epigynum (ventral, dorsal, lateral); D-G, ♂ palp (ventral, retrolateral, dorsal, entire palp). H-K, *Procambridgea ourimbah* sp. nov. ♂ palp (ventral, retrolateral, dorsal, entire palp). crp = cymbial retrolateral process; prta = posterior retrolateral tibial apophysis.

ventro-retrolateral and pointed retrolateral branches.

Female. CL 1.9 AL 2.3. Epigynum (Fig. 2H-J). Females 3.3-4.5 long.

DISTRIBUTION. Kioloa SF, NSW (Fig. 8A).

Procambridgea otwayensis Davies sp. nov. (Figs 3A-G, 8A)

ETYMOLOGY. From Otway Range, Victoria.

MATERIAL. HOLOTYPE: ♂, Erskine Falls, Otway Ra., Victoria, 38°27'S, 143°58'E, in log beech/eucalypt forest, 6

Apr. 1973, MRG (AMKS32764). Paratypes: Victoria, ♂, same data as holotype (AMKS58082); ♀, same locality, 5 Apr. 1973, MRG (AMKS32765); ♀, Beech forest, Otway Ra., 7 Apr. 1973, MRG (AMKS32766); ♀, Grey R. xing, Otways, 38°39'S, 143°50'E, 250m, 6 Nov. 1977, G.B.M., SRM (QMS42196).

DIAGNOSIS. Cymbial alveolus is twice as long as post-alveolus (cf., all previously described spp.). RTA with simple postero-retrolateral branch (cf., all described spp.).

DESCRIPTION. *Male.* CL 2.1 AL 2.2. Legs: I 11.4; II 9.7; III 8.0; IV 10.0. ♂ palp is short (Fig. 3D-G). Embolus spiniform arising from mid-prolateral tegulum; conductor large membranous; median apophysis needle-like. Course of sperm duct with arms of loop coming together and continuing parallel before the anterior arm enters embolus. Ratio of alveolus:post-alveolus is 1:0.5. Paracymbium a proximal bulge. RTA with ventro- and postero-retrolateral branches. Other ♂ was also 4.3 in length.

Female. CL 2.0 AL 2.3. Epigynum (Fig. 3A-C): gonopores open well lateral to the mid-line; spermathecae larger than other species. Females 4.1-4.3 long.

DISTRIBUTION. Otway Ra., Victoria (Fig. 8A).

Procambridgea ourimbah Davies sp. nov.
(Figs 3H-K, 8A)

ETYMOLOGY. From Ourimbah, NSW.

MATERIAL. HOLOTYPE: ♂, Gosford-Ourimbah, NSW, 33°24'S, 151°21'E, under logs, rainforest, May 1993 (AMKS35169).

DIAGNOSIS. No median apophysis (cf., *P. cavernicola*, *P. grayi*, *P. kialoa*, *P. otwayensis*). Paracymbium with strong retrolateral process (cf., all previously described spp.).

DESCRIPTION. *Male.* CL 2.3 AL 1.9. ♂ palp (Fig. 3H-K) with small membranous conductor, sclerotised distally. No median apophysis. Sperm duct simple with closed loop. Paracymbium with retrolateral process. Ratio of cymbial alveolus: postalveolus is 1:1.4. RTA with small ventro-retrolateral and pointed retrolateral branches.

Female. (unknown).

DISTRIBUTION. Ourimbah, NSW (Fig. 8A).

Procambridgea huntii Davies sp. nov.
(Figs 4A-F, 7, 8B)

ETYMOLOGY. In honour of the late Glenn Hunt, arachnologist and collector of the holotype.

MATERIAL. HOLOTYPE: ♂, Barrington Tops, NSW, 31°58'S, 151°28'E, eucalypt forest 1538m, 18 July 1971, G.S. Hunt (AMKS32761). Paratypes: NSW, 3 ♂, same data as holotype (AMKS58081); ♀, penult. ♂, Gloucester, 78km W of Barrington Tops Forest Rd, 32°01'S, 151°09'E, under log, 19 Mar. 1982, MRG J.L. Parriaby (AMKS8830); ♀, Tuglo, 50km NW Singleton, 32°14'S, 151°16'E, small sheet webs in logs, 19 Jan. 1977, MRG (AMKS32762).

DIAGNOSIS. A larger spider than other species. Very long post-alveolar region of cymbium, more than twice the length of alveolus (cf., all other spp. except *P. cavernicola*). RTA without small dorso-retrolateral branch (cf., *P. cavernicola*).

DESCRIPTION. *Male.* CL 2.8 AL 2.6. ♂ palp (Fig. 4C-F); embolus, slightly curved; conductor small with sclerotised tip; slender median apophysis; sperm duct with small open loop. Very long cymbium with sclerotised posterior edge; ratio of alveolus: post-alveolus is 1:2.4. RTA with ventro-retrolateral and bifid retrolateral branches. Males 5.2-5.8 long.

Female. CL 2.4 AL 2.5. Epigynum (Fig. 4A, B). The female from Tuglo was 7.2 long.

DISTRIBUTION. Eucalypt forest, Barrington Tops, NSW (Fig. 8B).

Procambridgea carrai Davies sp. nov.
(Figs 4G-M, 7D, 8B)

ETYMOLOGY. From Carrai SF, N.S.W.

MATERIAL. HOLOTYPE: ♂, Carrai SF, NSW, 80km W of Kempsey 31°01'S, 152°20'E, rainforest, 18 July 1971, MRG G.E. Gray (AMKS32747). PARATYPES: NSW, ♀, Carrai SF nr Carrai Bat Cave, in log, rainforest, 26 Apr. 1974, MRG (AMKS32748); 2 ♀, Carrai SF nr Carrai Arch Cave nr Kookaburra W of Kempsey, in cave, 1 Aug. 1971, L. Henshaw (AMKS32749); ♂, Carrai SF, start Kookaburra Trail, 31°02'S, 152°20'E, pyrethrum tree fern, 19 Oct. 1992, J. Stanisic, G. Ingram (QMS42240); 2 ♂, Mt Boss SF (Fenwicks), 31°12'S, 152°24'E, Oct. 1980, G.A. Webb, Forestry Commission (AMKS43510). OTHER MATERIAL: 2 ♂, Kerewong SF nr Lorne, 31°36'S, 152°34'E, PE, 15 July 1979, D. Milledge (AMKS5405); ♂, same data (AMKS5426); ♂, Kerewong SF, 31°35'S, 152°41'E, PE, 29 Aug. 1978, D. Milledge (AMKS1982).

DIAGNOSIS. RTA with dorso-retrolateral branch (cf., all species except *P. cavernicola*). Without median apophysis (cf., *P. cavernicola*).

DESCRIPTION. *Male.* CL 2.2 AL 2.3. ♂ palp (Figs 4J-M, 7D); short spiniform embolus, small conductor, without median apophysis. Sperm duct with open loop leading to embolus. Cymbium with sclerotised posterolateral edge; ratio of alveolus: post-alveolus is 1:1.8. RTA with

ventro-retrolateral, retrolateral and small dorso-retrolateral branches. Males 3.8-4.5 long. *Female.* CL 1.8 AL 2.1 Epigynum (Fig. 4G-I). Females 3.9-5.0 long.

DISTRIBUTION. Rainforest areas W of Kempsey, NSW, (Fig. 8B).

Procambridgea monteithi Davies sp. nov.
(Figs 5A-G, 8B)

ETYMOLOGY. In honour of Geoffrey Monteith, collector extraordinaire.

MATERIAL. HOLOTYPE: ♂, Point Lookout, New England NP, NSW, 30°30'S, 152°24'E, 1300m, PF 101, *Nothofagus* forest, 11 Nov. 1980-16 Mar. 1981, GBM (QMS42206). PARATYPES: NSW. ♂ ♀, Point Lookout (upper), New England NP, 1400m, PF 100, 21 Mar-11 Nov. 1980, GBM (QMS42253).

DIAGNOSIS. Cymbial alveolus longer than post-alveolus (cf., all previously described species except *P. otwayensis*). No median apophysis (cf., *P. otwayensis*). Palpal tibia with proximal retrolateral spur (cf., all spp.).

DESCRIPTION. *Male.* CL 1.6 AL 1.3; ♂ palp (Fig. 5D-G) curved embolus; large membranous conductor, sclerotised retrolaterally; without median apophysis. Sperm duct with double loop. Cymbium with flange-shaped paracymbium without processes; cymbial alveolus longer than post-alveolus 1:0.6. RTA with ventro-retrolateral and non-bifid retrolateral branches. Tibia with proximal retrolateral spur. Other male larger, 3.8. *Female.* CL 1.7 AL 2.1. Epigynum (Fig. 5A-C) Gonopores widely separated; insemination ducts enter spermathecae medially.

DISTRIBUTION. In beech forest in New England NP, N NSW (Fig. 8B).

Procambridgea lamington Davies sp. nov.
(Figs 5H-R, 8B)

ETYMOLOGY. From Lamington NP, Queensland.

MATERIAL. HOLOTYPE: ♂, Lamington NP, SE Queensland, 28°11'S, 153°11'E, 9-10 Aug. 1977, RJR (QMS42200). PARATYPES: Queensland. ♂, same data as holotype (QMS42239); ♀, 2♂, Lamington NP, notophyll forest, 9 July, 1977, RJR (QMS42199); ♀, Nagarigoon, Lamington NP, PF, 27 Mar.-8 Apr. 1976, RJR, VED (QMS42201); 3♀, ♂, Nagarigoon Ck, 5 Apr. 1976, RJR, VED (QMS42215); ♂, Lamington NP, 9-10 Aug 1977, RJR (QMS42216); ♂, Binnaburra, Lamington NP, 1 July 1986, M.S. Harvey, P.J. Vaughan (WAM 98/2095); ♀, Daves Ck Country, Lamington NP, 3 Apr. 1976, RJR (QMS42217); ♀, Morans Falls, Lamington NP, 28°19'S, 153°05'E, 900m, Berlesate 924, rainforest stick

brushing, 15 Mar. 1997, GBM, B. Russell (QMS42218); ♀, Albert R, rt Branch, Lamington NP, 244m, PF 65, 8 Sept.-30 Oct. 1976, GBM, SRM (QMS42219). 5♂, 2♀, Springbrook, 28°15'S, 153°16'E, 1000m, rainforest, PF, 28 Oct. 1991, M. De Baar (QMS23032); 2♀, Springbrook Repeater Stn, 1000m, stick brushing Berlesate, 27 May 1997, GBM (QMS42198); ♀, Upper Tallebudgera Valley, SEQ, 28°14'S, 153°18'E, 530m, PF, Mar.-July, 1985, D. Cook (QMS42220); 2♂, 2♀, Mt Tamborine, 27°55'S, 153°10'E, 10 July 1974, VED, RJR, C.L. Wilton (QMS42254).

DIAGNOSIS. Paracymbium with retrolateral and ventral processes (cf. previously described spp.).

DESCRIPTION. *Male.* CL 2.1 AL 2.0. ♂ palp (Fig. 5O-R): with curved embolus, large retrolaterally sclerotised conductor, no median apophysis; sperm duct with transverse double loop. Cymbial alveolus about twice as long as post-alveolus 1:0.6. Paracymbium with ventral and retrolateral processes. RTA with ventro-retrolateral and bifid retrolateral branches. Males 4.0-4.6 long.

Female. CL 2.0 AL 2.7. Carapace (Fig. 5H) without pattern. Sclerotisation of median epigynal ridge varies (Fig. 5J, K). Dorsal, lateral and posterior views (Fig. 5L-N) show the course of the insemination ducts. Females 3.6-4.7 long.

DISTRIBUTION. Lamington Plateau and Springbrook area, SE Queensland (Fig. 8B).

Procambridgea hilleri Davies sp. nov.
(Figs 6A-G, 7A-C, 8B)

ETYMOLOGY. In honour of naturalist A. Hiller, collector of the holotype.

MATERIAL. HOLOTYPE: ♂, Mt Glorious, SE Queensland, 27°20'S, 152°46'E, rainforest, malaise trap, 27 June-18 Oct 1982, A. Hiller (QMS42203). PARATYPES: Queensland ♀, Mt Glorious NP, rainforest, 6 Jan. 1977, B.J. and M.J. Marples, RJR, VED (QMS42221); ♀, Mt Tenison Woods, 27°19'S, 152°44'E, 750m, rainforest, stick brushing, 15 May 1997, GBM (QMS42222); ♂, 22 Mar. 1979, GBM (QMS42255); ♂, Mt Mee, via Samford, 27°05'S, 152°41'E, 518m, rainforest, PF 14, 1974-1975, GBM, SRM (QMS42202); ♀, Mt Nebo, 27°23'S, 152°47'E, rainforest, 10 Sept. 1973, C. Wallace (QMS42256); 3♀, ♂, 2 penult. ♂, Booloumba Ck, Conondale Ra, SEQ, 26°39'S, 152°39'E, 13-18 May 1976, RJR (QMS42234); ♂, Casey Ck via Imbil, 26°29'S, 152°38'E, PF 3, 10 Aug.-9 Nov., 1974, GBM, SRM, (QMS42236); ♀, Mt Cabinet via Jimna, 26°43'S, 152°34'E, PF, 29 June-23 Aug. 1975, GBM, SRM (QMS42237); ♀ Tungi Ck, via Jimna, 26°39'S, 152°28'E, 550m, PF 28, 29 Mar.-16 June 1975, GBM, SRM (QMS42238).

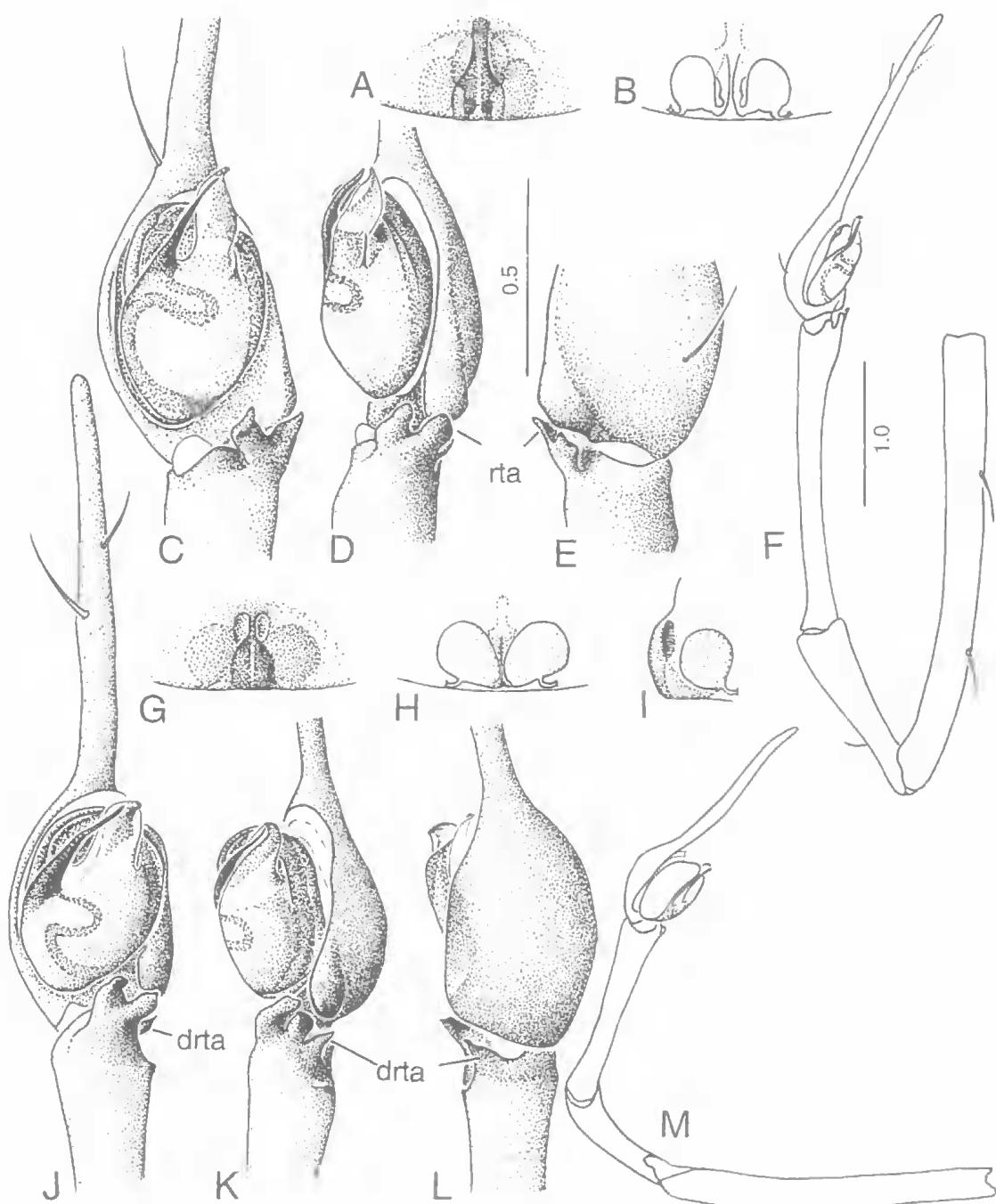


FIG. 4. A-F, *Procambridgea hundi* sp. nov. A,B, epigynum (ventral, dorsal); C-F, ♂ palp (ventral, retrolateral, dorsal, entire palp). G-M, *Procambridgea carrai* sp. nov.: G-I, epigynum (ventral, dorsal, lateral); J-M, ♂ palp (ventral, retrolateral, dorsal, entire palp). drta = dorso-retrolateral tibial apophysis; rta = retrolateral tibial apophysis.

DIAGNOSIS. Paracymbium with retrolateral lamington); ventral process small and blunt (cf. and ventral processes (cf., all species except *P. lamington* well-defined, pointed).

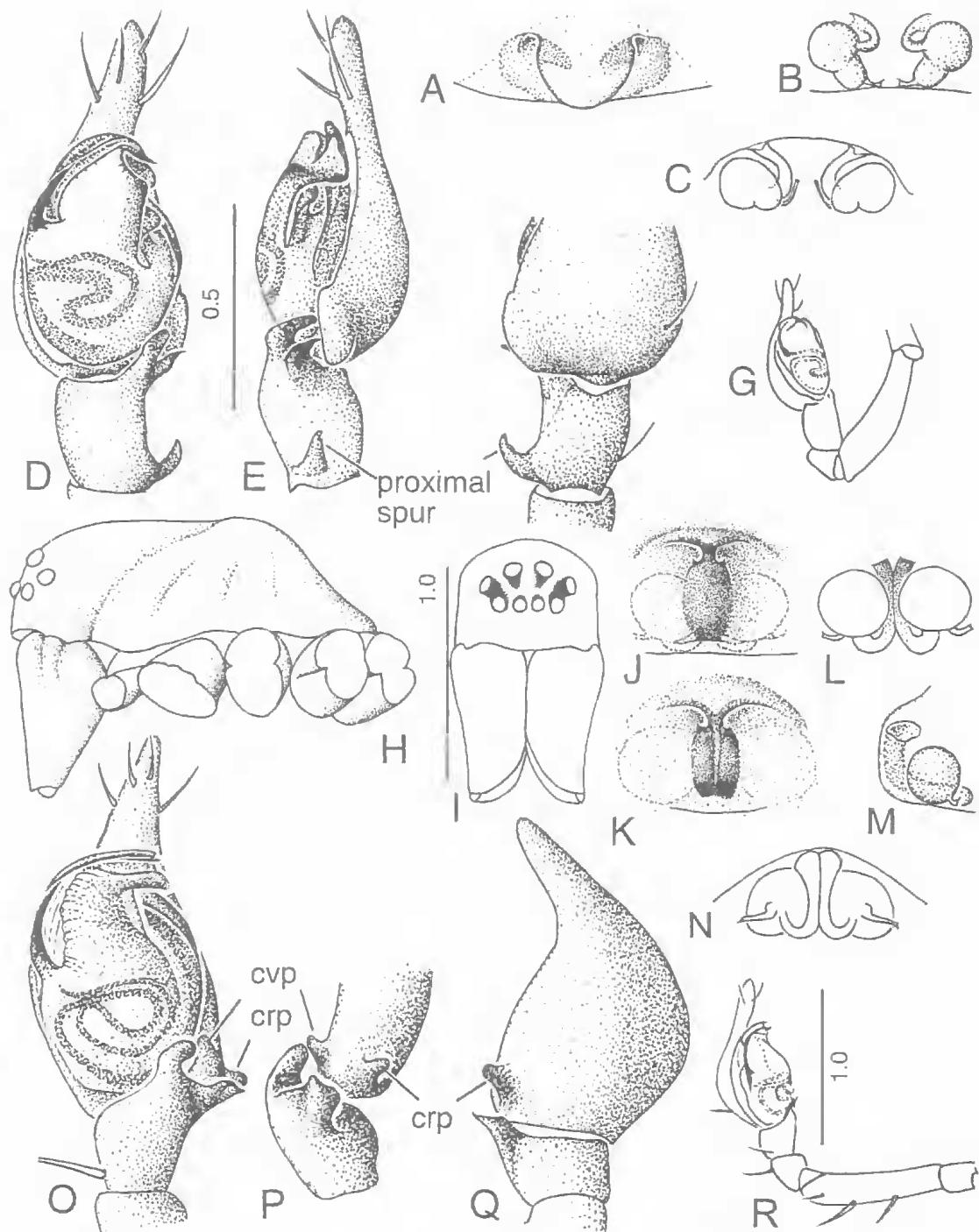


FIG. 5. A-G, *Procambridgea monteithi* sp. nov. A-C, epigynum (ventral, dorsal, posterior); D-G, ♂ palp (ventral, retrolateral, dorsal, entire palp). H-R, *Procambridgea lumington* sp. nov.; H, carapace; I, Eyes, frontal; J, K, epigyna, ventral; L-N, epigynum (dorsal, lateral, posterior). O-R, ♂ palp (ventral, retrolateral, dorsal, entire palp). crp = cymbial retrolateral process; cvp = cymbial ventral process.

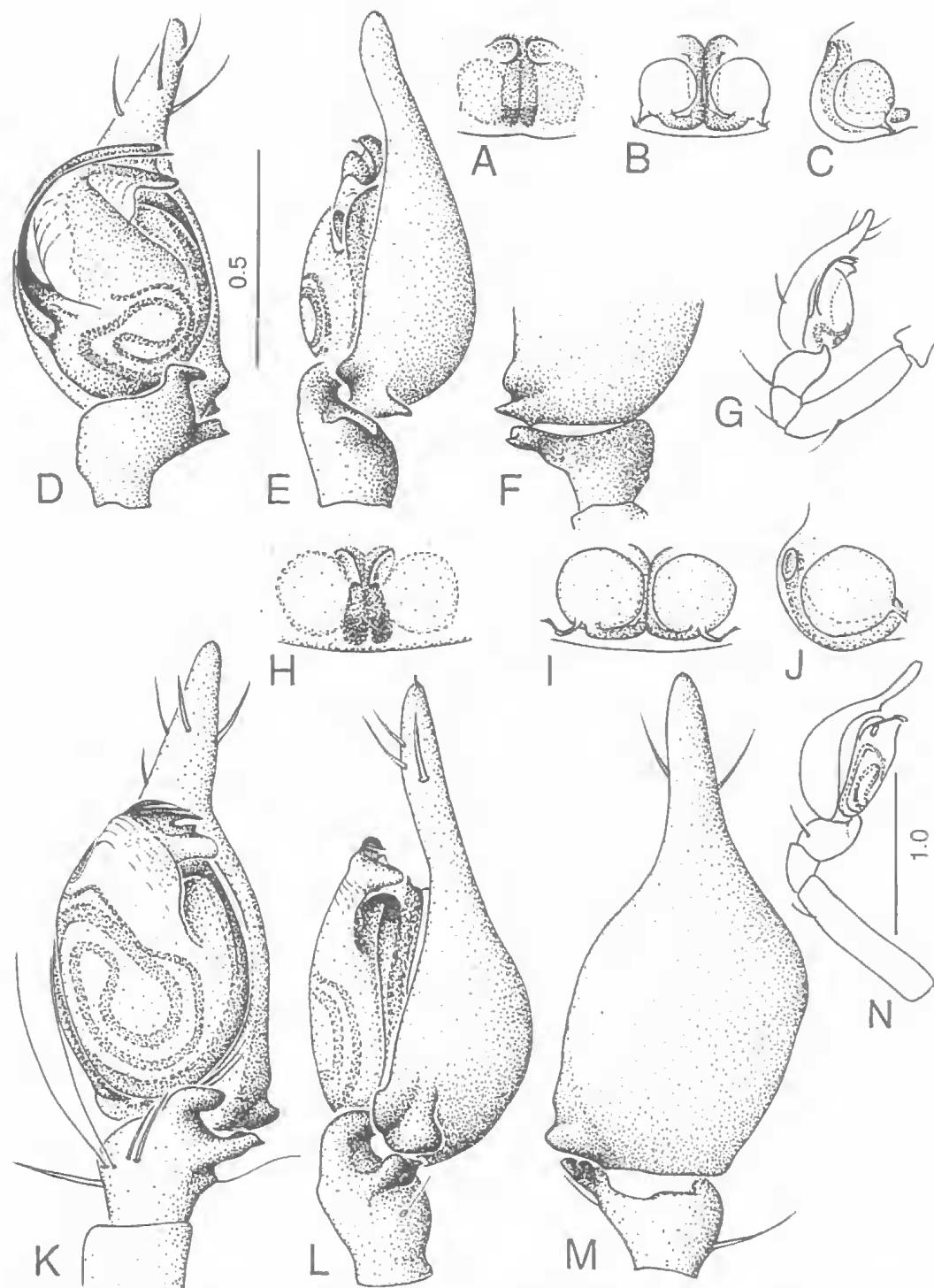


FIG. 6. A-G, *Procambridgea hilleri* sp. nov. A-C, epigynum (ventral, dorsal, lateral); D-G, ♂ palp (ventral, retrolateral, dorsal, entire palp). H-N, *Procambridgea montana* sp. nov.; H-I, epigynum (ventral, dorsal, lateral); K-N, ♂ palp (ventral, retrolateral, dorsal, entire palp).

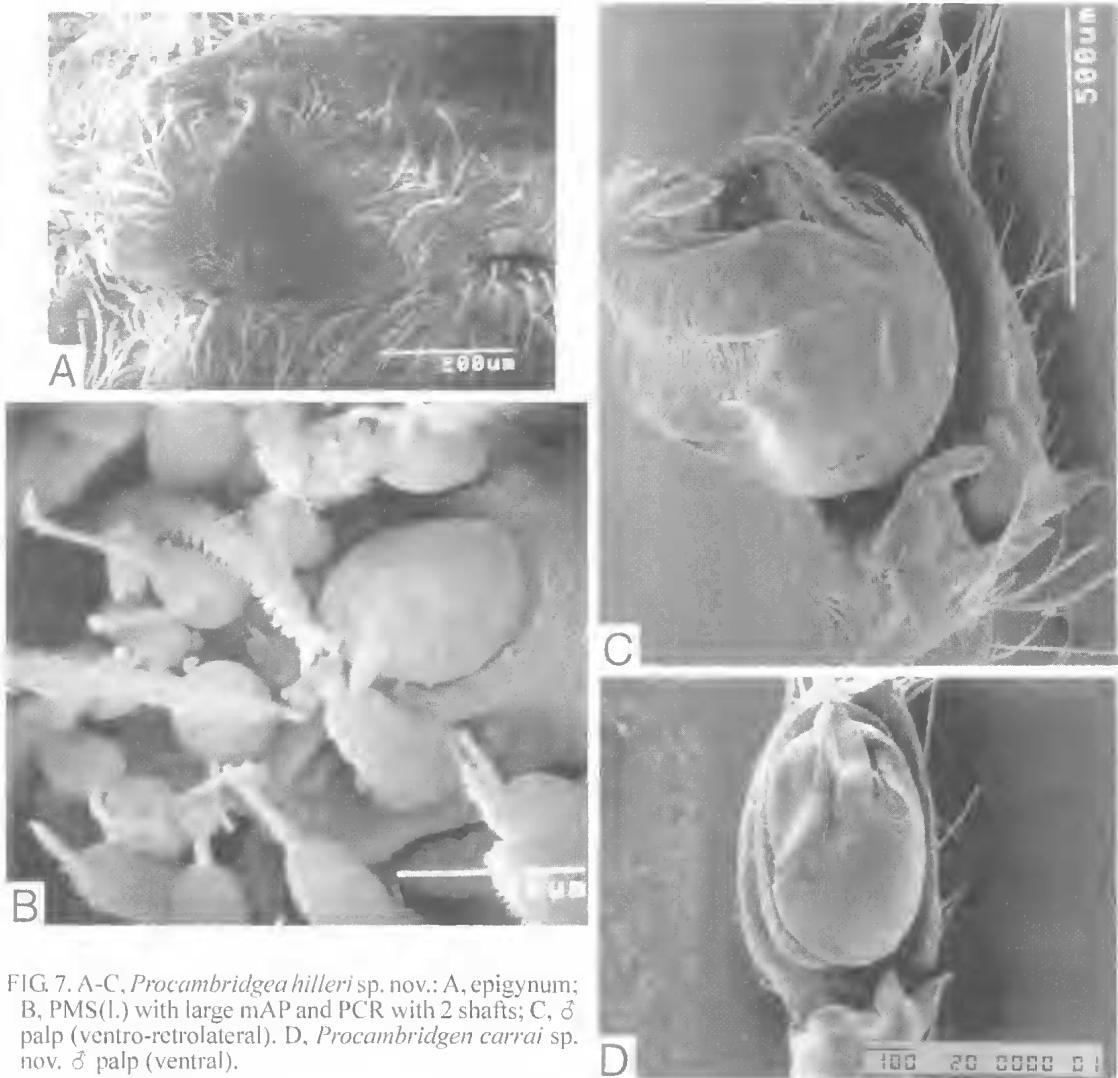


FIG. 7. A-C, *Procambridgea hilleri* sp. nov.: A, epigynum; B, PMS(l.) with large mAP and PCR with 2 shafts; C, ♂ palp (ventro-retrolateral). D, *Procambridgea carrai* sp. nov. ♂ palp (ventral).

DESCRIPTION. *Male.* CL 1.9 AL 1.7. ♂ palp (Figs 6D-G, 7C) with large retrolaterally sclerotised conductor, no median apophysis; sperm duct with transverse double loop, arms of loop not touching. Cymbial alveolus: post-alveolus, 1:0.7. Paracymbium with sharp retrolateral spur and small blunt ventral process. RTA with obliquely angled ventro-retrolateral and bifid retrolateral branches. Males varied in length from 3.4-4.0.

Female. CL 1.8 AL 2.3. Epigynum (Figs 6A-C, 7A). ALS with 2 MAP, about 25 piriform spigots. PMS with large anterior mAP, some paracribellar spigots, one with 2 shafts on base (Fig. 7B), one posterior cylindrical spigot and aciniforms. Females 3.5-4.3 long.

DISTRIBUTION. D'Aguilar and Conondale Ranges, SE Queensland (Fig. 8B).

***Procambridgea montana* Davies sp. nov.**
(Figs 6H-N, 8B)

ETYMOLOGY. From Latin 'montanus', of mountains.

MATERIAL. HOLOTYPE: ♂, Mistake Mtns (north) 27°58'S, 152°22'E, via Goomburra, SE Queensland, 975m, PF 74, 13 Feb.-13 Oct. 1977, GBM, SRM (QMS42224). PARATYPES: Queensland. ♂, Mistake Mtns (middle) 27°58'S, 152°23'E, via Goomburra, 950m, PF 75, 13 Feb.-13 Oct. 1977, GBM, SRM (QMS42223); 2♀, Mistake Mts, 16 Oct. 1976, RJR (QMS42226); ♂, Bald Mt via Emu Vale, 28°14'S, 152°22'E, 1130m, PF 20, 30 Mar.-2 Aug 1975, GBM, SRM (QMS42205); 3♀, Mt Superbus, 28°14'S, 152°28'E, PF, 12 Mar.-13 June 1990,

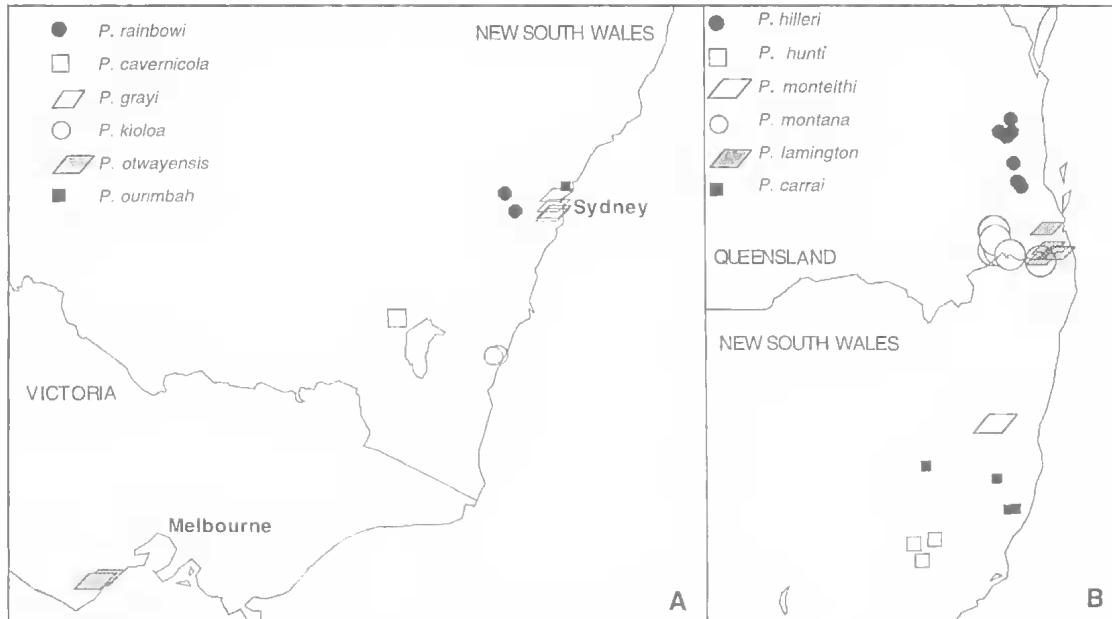


FIG. 8. A, B, Maps showing distribution of *Procambridgea* spp.

T. Churchill, RJR (QMS15917); ♀, Mt Superbus, 30 Oct. 1990. T. Churchill, RJR. K. Williams (QMS25888); ♂, ♀, same locality and collectors, 1000m, PF, 13 June-30 Oct. 1990 (QMS26292); ♀ Mt Superbus, 1360m, moss on tree trunks, 3 Mar. 1983. D. Yeates (QMS42258); stick brushing, GBM (QMS42259); ♀ Spicers Peak, 28°06'S, 152°24'E, 1200m, 30-31 Dec. 1993, GBM (QMS42230); ♂, 3♀, Cunningham's Gap, 28°03'S, 152°23'E, sieved litter, dry forest, 28 June 1991, D. Black (WAM 98/2084-7). NSW. 2♂, Nothofagus Mt via Woodenbong, 28°17'S, 152°37'E, 1100m, Berlesate No 416 from stick brushing, 17 June 1982, GBM, G. Thompson (QMS42197); ♂, ♀, Brindle Ck, Wiangaree via Kyogle, 28°22'S, 153°04'E, 740m, PF 42, 22 Mar-2 Aug. 1975, GBM, SRM (QMS42257).

DIAGNOSIS. Short embolic area, about a quarter length of tegulum (cf., *P. hilleri*, *P. lamington*, about half length of tegulum). Sperm duct with longitudinal double loop (cf., *P. monteithi*, transverse double loop).

DESCRIPTION. *Male.* CL 1.8 AL 1.5. ♂ palp (Fig. 6K-N) with short distal embolus, membranous conductor, no median apophysis. Sperm duct in double loop (longitudinal rather than transverse). Ratio of alveolus: post-alveolus is 1:0.6. Paracymbium with very small ventral process and retrolateral process. Tibia short, as long as wide. RTA with curved ventro-retrolateral and bifid retrolateral branches. Males 3.2-3.8 long.

Female. CL 2.4 AL 2.4. Epigynum (Fig. 6H-J). Females 4.8-5.2 long.

DISTRIBUTION. In the area where the McPherson Range meets the Great Dividing Range (Fig. 8B) on the Queensland/New South Wales border.

RELATIONSHIPS OF PROCAMBRIDGEA

TERMINAL TAXA. A cladistic analysis examined 52 characters (Table 1) for relationships of the 12 *Procambridgea* spp. and 27 other Australian taxa as well as *Amaurobius* from the Northern Hemisphere, and *Amphinecta* and *Matachia* from New Zealand (Table 2). Outgroup comparison was with *Oecobius navus* Blackwall. The data matrix (Table 2) was prepared using MacClade version 3.08 (Maddison & Maddison 1999) and PAUP*. Fig. 9 was prepared using PAUP*. Fig. 10 was prepared using CLADOS version 1.2 (Nixon 1992) with DELTRAN optimisation.

DATA ANALYSIS. We analysed the data matrix for the 42 taxa (Table 2) using PAUP* version 4.0b4a (Swofford, 1999) on a Power Macintosh 7100/66. Heuristic searches of the data were completed using 10 random step-wise addition sequences, tree-bisection-reconnection (TBR) branch swapping, MULPARS, and branches having maximum length zero collapsed to yield polytomies. Strict and semistrict (Bremer, 1990) consensus trees of the most parsimonious trees (MPTs) were computed using PAUP*. Analyses

TABLE 1. Characters and character states.

1	AME: as large or larger than ALE (0); smaller (1)
2	CH: normal (0); small (1)
3*	Retromarginal CH teeth: no teeth (0); 1 (1); 2 (2); 3 (3); 3+ (4); 5+ (5)
4*	Promarginal CH teeth: no teeth (0); 2 (1); 3 (2); 3+ (3); 5+ (4)
5	Long prolateral seta at base of fang: absent (0); present (1)
6	Carapace: round (0); oval (1)
7	Enlarged frontal CH seta: absent (0); present (1)
8	Foveal area highest: absent (0); present (1)
9	♀ leg I: shorter than leg IV (0); equal to or longer than leg IV (1)
10	Stridulatory ridges on ♂ coxa I: absent (0); present (1)
11	Enlarged ventral spines on tibia and MT I and II: absent (0); present (1)
12	Feathery hairs: absent (0); present (1)
13	MT preening comb: absent (0); present (1)
14	MT TRICH: 2+ (0); 1 (1)
15*	T TRICH: 0 (0); 2+ (1); double row (2)
16	T rod: absent (0); present (1)
17	Anal tubercle: normal (0); enlarged (1)
18	CR spinning fields: 2 (0); 1 (1); absent (2)
19*	CAL: proximal (0); proximo-medial (1); long medial (2); no CAL (3)
20	MAP ♀ ALS: 2 (0); 1 and nubbin (1); 1 (2)
21	MAP ♀ ALS: mesal (0); anterior (1)
22*	PCR ♀ PMS: one shaft per base (0); more than one shaft (1); absent (2); no CR (3)
<i>Female characters</i>	
23	Medial EPIG atrium: absent (0); present (1)
24*	Posterior rim of medial atrium/EG: no medial atrium (0); close (1); well forward (2)
25*	ID: simple (0); loosely coiled (1); tightly coiled (2)
26*	Posterior EPIG scape: no scape (0); small knob (1); short (2); long (3)
27	Lateral projections on EPIG: absent (0); present (1)
28	Lateral EPIG teeth: absent (0); present (1)
<i>Male characters</i>	
29	E shape: spiniform (0); broad (1)
30	Direction of E: clockwise (0); anti-clockwise (1)
31	PE APOPH: absent (0); unbranched (1); branched (2)
32	E APOPH with 2-3 long setae: absent (0); present (1)
33*	E APOPH plate-like setae: absent (0); small (1); large (2)
34*	Shape of C: irregular (0); rounded (1); plate-like (2); T-shaped (3); s-shaped - falciform (4)
35	C/E: opposite (0); embracing (1)
36	Position of embracing C: retrolateral (0); prolateral (1)
37*	C length/ tegulum: quarter (0); half (1); whole (2)
38	Secondary C: absent (0); present (1)
39	Median APOPH: absent (0); present (1)
40*	Loops of sperm duct: simple (0); 1 (1); 2 (2); 3 (3)
41	Oriental of CB to bulb: dorsal (0); mesal (1)
42*	CB alveolus/ post-alveolus: shorter (0); equal (1); longer (2); twice as long (3)
43*	PCB process: absent (1); 1, retrolateral (1); 2, retrolateral and ventral (2)
44	RTA: absent (0); present (1)
45*	RTA/CB length: absent (0); quarter or less (1); more than half (2)
46	RTA dorsal branch: no RTA (0); branch absent (1); branch present (2)
47*	RTA with small dorso-retrolateral branch: no RTA (0); branch absent (1); branch present (2)
48	RTA extra distal branch: no RTA (0); extra branch absent (1); extra branch present (2)
49*	RTA proximal projection: no RTA (0); no proximal projection (1); proximal projection (2)
50	Tibial proximal retrolateral projection: absent (0); present (1)
51	Palpal tibia length/width: shorter to slightly longer than wide (0); much longer than wide (1)
52	Palpal P APOPH: absent (0); present (1)
[* Multistate characters treated as unordered]	

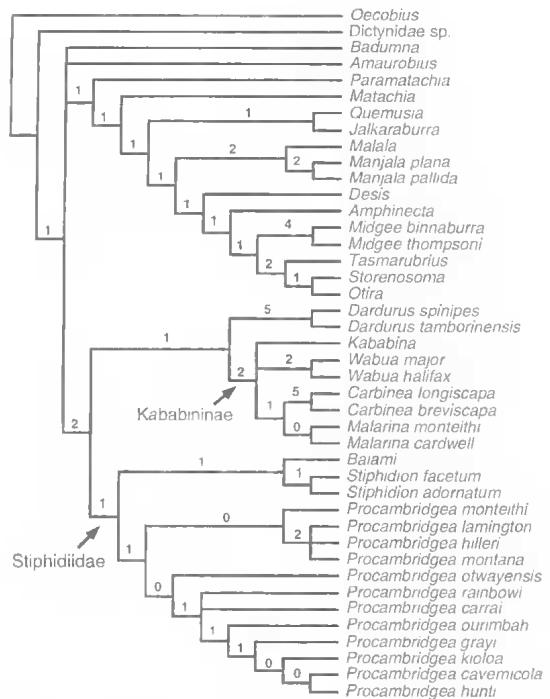


FIG. 9. Semistrict consensus of 36 MPT showing Bremer supports above the nodes.

were repeated using Hennig86 version 1.5 (Farris, 1988). The command mh* was used to find initial trees. The trees retained were then passed to the extended branch swapper, bb*. Bremer support (Källersjö et al., 1992) to indicate character support for nodes on the cladogram was calculated using the computer program TreeRot (Sorenson, 1999) on the preferred MPT with 20 random step-wise addition sequences, and support indicated above the nodes on the semistrict consensus tree (Fig. 9).

RESULTS. Heuristic searches of the 52 characters for the 42 taxa generated 36 MPTs of tree length 185, consistency index (Kluge & Farris, 1969) 0.46, consistency index excluding uninformative characters 0.42, retention index (Farris, 1989) 0.71 and rescaled consistency index 0.33. Hennig86 finds the same 36 MPTs. Many of the MPTs have terminal polytomies in *Procambridgea* (Fig. 10) as synapomorphic characters were not able to be scored across all taxa. Thus the strict consensus is less resolved. The MPTs are divided into two groups of 18 cladograms that differ markedly in the placement of *Amaurobius* in the Amaurobioidea (see

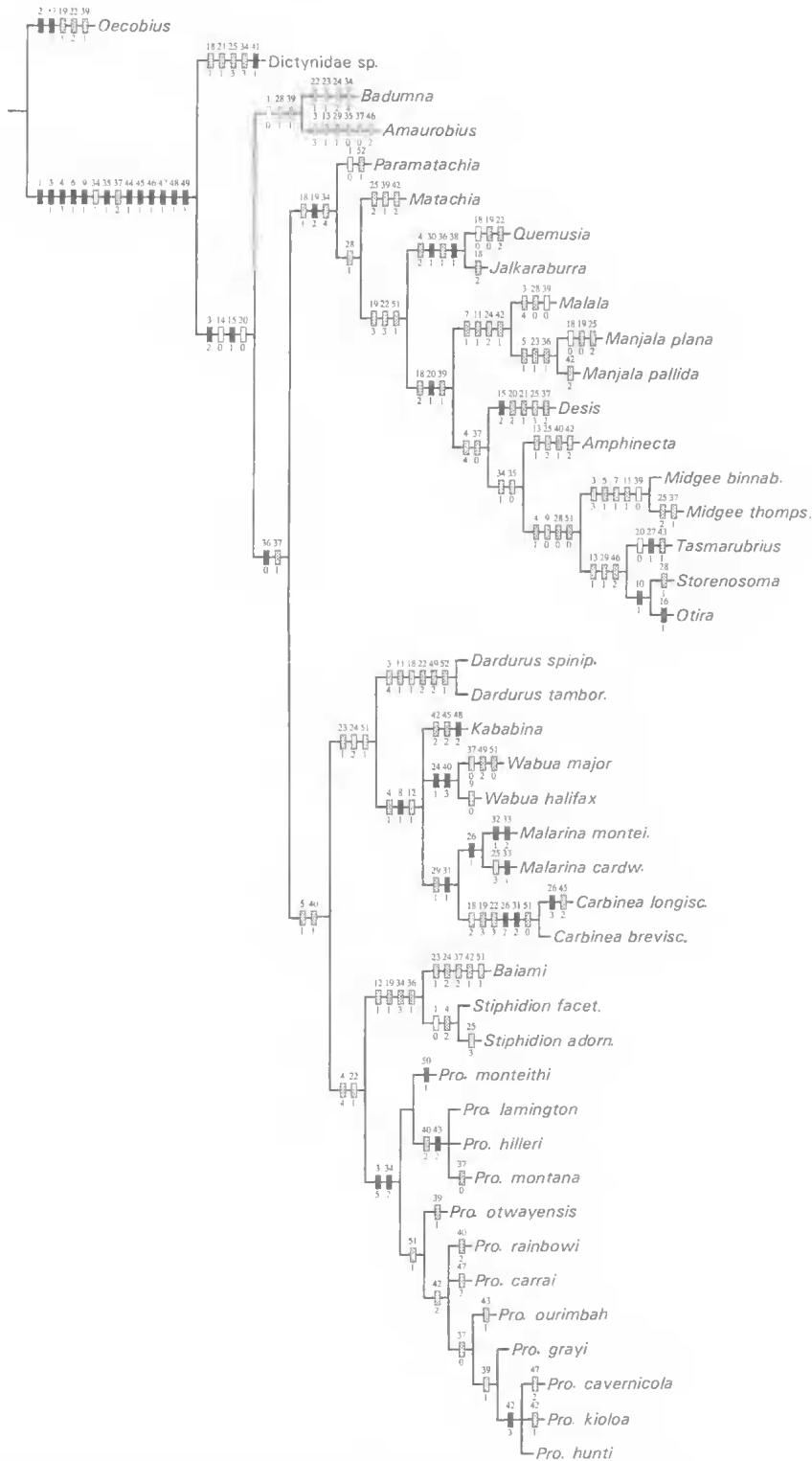


FIG. 10. Preferred most parsimonious tree showing characters and characters states.

TABLE 2. Data matrix.

Taxa	Character Number				
	10	20	30	40	50
<i>Oecobius navus</i> Blackwall	0100000000	0001001012	0200100000	0000?0010	0000000000 00
<i>Dictynidae</i> sp.	1013010010	0001000102	1000300000	0003112000	1001111110 00
<i>Badumna longinqua</i> (Koch)	0023010010	0000100000	0112100100	0004112010	0001111110 00
<i>Matachia ramulicola</i> Dalmas	1023010010	0000100120	0000200100	000410101?	0201111110 00
<i>Paramatachia decorata</i> Dalmas	0023010010	0000100130	0000100000	0004101000	0001111110 01
<i>Desis</i> sp.	1024010010	0000200232	1300300100	0004102010	0001111110 10
<i>Quemusia aquilonia</i> Davies	1022010010	0000100000	0200100101	0004111100	0001111110 10
<i>Jalkaraburra alta</i> Davies	1022010010	0000100230	0300100101	0004111100	0001111110 10
<i>Amphinecta milina</i> Forster & Wilton	1024010010	0010100231	0300200100	00010?0011	0201111110 10
<i>Amaurobius fenestralis</i> (Stroem)	0033010010	0010100000	0000100110	00010?0010	0001121110 00
<i>Storenosoma terranea</i> Davies	1021010010	0010100231	0300100110	00010?0010	0001121110 00
<i>Otira summa</i> Davies	1021010001	0010110231	0300100010	00010?0010	0001121110 00
<i>Tasmariabrius milvinus</i> (Simon)	1021010000	0010100230	0300101010	UDU10?0010	0011121110 00
<i>Stiphidion facetum</i> Simon	0022110010	0100100010	0100100000	0003111001	0001111110 00
<i>Stiphidion adornatum</i> Davies	0022110010	0100100010	0100300000	0003111001	0001111110 00
<i>Baiami volucripes</i> (Simon)	1024110010	0100100010	0112100000	000311200?	0101111110 10
<i>Midgee binnaburra</i> Davies	1031111000	1000100031	0300100000	00010?0000	0001111110 00
<i>Midgee thompsoni</i> Davies	1031111000	1000100231	0300200000	00010?1000	0001111110 00
<i>Manjala plana</i> Davies	1023111010	1000100000	0?12300100	0004111010	0101111110 10
<i>Manjala pallida</i> Davies	1023111010	1000100231	0312100100	0004111010	0201111110 10
<i>Malala lubinae</i> Davies	1043011010	1000100031	0302100000	0004101000	0101111110 10
<i>Dardurus spinipes</i> Davies	1043110010	1000100100	0212100000	0001101001	0001111120 11
<i>Dardurus tamborinensis</i> Davies	1043110010	1000100100	0212100000	0001101001	0001111120 11
<i>Kababina alta</i> Davies	1043110010	1000100100	0212100000	0001101001	0001111120 11
<i>Carbinea longiscapa</i> Davies	1021110110	0100100230	0312130010	2001101001	0001121110 00
<i>Carbinea breviscapa</i> Davies	1021110110	0100100230	3001101001	0001111110 00	
<i>Malarina monteithi</i> Davies	1021110110	0100100000	0012110010	1121101001	0001111110 10
<i>Malarina cardwell</i> Davies	1021110110	0100100000	0012310010	1011101001	0001111110 10
<i>Wabua major</i> Davies	1021110110	0100100000	0011100000	0001110003	0001111120 00
<i>Wabua halifax</i> Davies	1021110100	0100100000	0011100000	0001101003	0001111110 10
<i>Procambridgea rainbowi</i> (Forster & Wilton)	1054110010	0000100000	0100100000	0003101002	0201111110 10
<i>Procambridgea cavernicola</i> (Forster & Wilton)	1054110010	0000100000	0100100000	0003100001	0301112110 10
<i>Procambridgea grayi</i> sp. nov.	1054110010	0000100000	0100100000	0003100001	0201111110 10
<i>Procambridgea kieloa</i> sp. nov.	1054110010	0000100000	0100100000	0003100001	0101111110 10
<i>Procambridgea otwayensis</i> sp. nov.	1054110010	0000100000	0100100000	0002101011	0001111110 10
<i>Procambridgea curimbah</i> sp. nov.	1054110010	0000100000	0100100000	0002100001	0211111110 10
<i>Procambridgea hunti</i> sp. nov.	1054110010	0000100000	0100100000	0002100011	0301111110 10
<i>Procambridgea carrai</i> sp. nov.	1054110010	0000100000	0100100000	0002101001	0201112110 10
<i>Procambridgea monteithi</i> sp. nov.	1054110010	0000100000	0100100000	0002101001	0001111111 00
<i>Procambridgea lamington</i> sp. nov.	1054110010	0000100000	0100100000	0002101001	0211111110 00
<i>Procambridgea hilleri</i> sp. nov.	1054110010	0000100000	0100100000	0002101003	0031111110 00
<i>Procambridgea montana</i> sp. nov.	1054110010	0000100000	0100100000	0002100003	0031111110 00

discussion). Thus the semistrict consensus of the 36 MPTs (Fig. 9) indicates a basal polytomy that leaves the placement of *Amaurobius* ambiguous. Nodes on the semistrict consensus tree (Fig. 9) that receive a Bremer support of 0 do not indicate conflict between the topologies but show that those nodes are unresolved in some of the MPTs. Figure 10 shows characters and character states on the preferred MPT with *Amaurobius* forming a basal clade with *Badumna*.

DISCUSSION

Cladistic analyses including many taxa of the Amaurobioidea, outlined the difficulty of family placement of the Kababininae (Davies, 1999; Davies & Lambkin, 2000, 2001). Analysis of the Amaurobioidea, including many taxa of *Procambridgea*, continues to present difficulties

with family placement. The Amaurobioidea, Kababininae, and *Procambridgea* form well-resolved clades. However, inclusion of *Procambridgea* with a further 12 taxa, into the analysis causes changes to the basal topology, and results in two alternative resolutions for the placement of *Amaurobius fenestratus* (Stroem). In 18 MPT *Amaurobius* forms a third, basal clade with *Badumna* (Fig. 10). Therefore in these MPTs the Amaurobioidea does not form the two distinct clades seen in previous analyses (Davies, 1999; Davies & Lambkin, 2000, 2001.). In the other 18 MPT *Amaurobius* is sister to the large clade including *Dardurus*, the Kababininae, *Stiphidion* and *Procambridgea*. In all MPT one clade continues to contain the type genera of the Desidae and Amphinectidae (Figs 9, 10).

Procambridgea forms a separate group, distinct from the Kababininae, and more closely related to *Stiphidion* and *Baiania*. The Bremer support for these relationships is poor, never more than 1, and based entirely on homoplasious characters (Fig. 10); thus *Procambridgea* remains in the Stiphidiidae. *Procambridgea* contains two species-groups: a northern group comprising *monteithi*, *lamington*, *hilleri*, and *montana* and a more southern group of *rainbowi*, *cavernicola*, *grayi*, *kioloa*, *ourimbah*, *lunti*, *carrai*, and *otwayensis*; however support for these groups is poor.

ACKNOWLEDGEMENTS

We are indebted to the curators and collection managers of the Australian, Western Australian and New Zealand Museums for loans of material and to all collectors of material for this revision. We thank the Council of the Australian Biological Resources Study for funding rainforest surveys in Queensland during which some of this material was collected and for financial support of illustrator and co-author, Christine Lambkin. She also set up the cladistic analyses resulting in the cladograms. We are grateful for the support of other members of the Queensland Museum, particularly Jennifer Cannon and Christine Thai for their help in the preparation of this paper.

LITERATURE CITED

- BREMER, K. 1990. Combinable component consensus. *Cladistics* 6: 369-372.
- BRIGNOLI, P.M. 1983. In Merrett, P. (ed.) Catalogue of Araneae described between 1940-1981. (Manchester University Press: Manchester, UK).
- DAVIES, V.T. 1999. A new spider genus from North Queensland, Australia (Araneae: Amaurobioidea: Kababininae). *Journal of Arachnology* 27 (1): 25-36.
- DAVIES, V.T. & LAMBKIN, C. L. 2000. *Malarina*, a new spider genus (Araneae: Amaurobioidea: Kababininae) from the wet tropics of Queensland, Australia. *Memoirs of the Queensland Museum* 45(2): 273-283.
2001. *Wabua*, a new spider genus (Araneae: Amaurobioidea: Kababininae) from north Queensland, Australia. *Memoirs of the Queensland Museum* 46(1): 231-249.
- FARRIS, J.S. 1988. Hennig86 Version 1.5. Port Jefferson: New York.
1989. The retention index and the rescaled consistency index. *Cladistics* 5: 417-419.
- FORSTER, R.R. & WILTON, C.L. 1973. The spiders of New Zealand. Pt IV. *Otago Museum Bulletin* 4: 1-309.
- KALLERSJÖ, M., FARRIS, J.S., KLUGE, A.G. & BULT, C. 1992. Skewness and permutation. *Cladistics* 8: 275-287.
- KLUGE, A.G. & FARRIS, J.S. 1969. Quantitative phylogenetics and the evolution of Anurans. *Systematic Zoology* 18: 1-32.
- LEHTINEN, P.T. 1967. Classification of the cribellate spiders and some allied families, with notes on the evolution of the suborder Aranomorpha. *Annales Zoologici Fennici* 4: 199-468.
- MADDISON, W.P. & MADDISON, D.R. 1999 MacClade Version 3.08a. (Sinauer Assoc. Inc.: Sunderland, Massachusetts).
- NIXON, K.C. 1992. Clados, Version 1.2. (L.H. Baily Hortorium, Cornell University: Ithaca).
- PLATNICK, N.I. & SHADAB, M.U. 1975. A revision of the spider genus *Gnaphosa* (Araneae: Gnaphosidae) in America. *Bulletin of the American Museum of Natural History* 155: 1-16.
- SORENSEN, M.D. 1999. TreeRot, Version 2. (Boston University: Boston, Massachusetts).
- SWOFFORD, D.L. 1999. Phylogenetic Analysis Using Parsimony (* and other methods). Version 4.0b4a. (Sinauer Assoc. Inc.: Sunderland, Massachusetts).